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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,500	11/21/2003	Joseph Chappell	8064-005-CIP-2	8924
32301 7590 03/06/2008 CATALYST LAW GROUP, APC 9710 SCRANTON ROAD, SUITE S-170 SAN DIEGO, CA 92121				
EXAMINER				
KALLIS, RUSSELL				
ART UNIT		PAPER NUMBER		
1638				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/717,500

**Applicant(s)**

CHAPPELL ET AL.

**Examiner**

RUSSELL KALLIS

**Art Unit**

1638

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 10-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG/US)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

Claims 10-19 are pending and examined

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

#### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/12/2007 has been entered.

#### ***Claim Rejections - 35 USC § 112***

Claims 10-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. THIS IS A NEW MATTER REJECTION.

The added claimed material which is not supported by the original disclosure is as follows: Newly amended claim 10 recites "at least one isoprenoid reaction product . . ." in line 5, and "more than one isoprenoid reaction product in a ratio differing from the ratio of the products produced in the absence of the second isoprenoid synthase polypeptide" in lines 7-8, while the specification only supports the production of isoprenoid reaction products that are not produced in the absence of the second domain of the second, heterologous isoprenoid synthase (page 4

specification lines 8-9); and is completely silent with respect to “more than one isoprenoid reaction product” and “the ratio of products produced in the absence of the second isoprenoid synthase polypeptide” recited in part (2) of amended claim 10. Thus, the claims are drawn to NEW MATTER. Applicant is invited to point to the page and line number in the specification where support can be found. Absent of such support, Applicant is required to cancel the new matter in the reply to this Office Action.

Claims 10-19 remain rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. This rejection is maintained for the reasons of record set forth in the Official action mailed 12/13/2006 and 7/12/2007. Applicant's arguments filed 12/12/2007 have been considered but are not deemed persuasive.

Applicant asserts that the written description requires that possession of the invention has been conveyed with reasonable clarity and that the insertion of specific language into the claims reciting the domains involved in the chimeric proteins encoded by the DNA constructs, together with the activity of the chimeric proteins are sufficient identifying characteristics, as applied to the amended claims, to meet the standard (response page 10). This is not found persuasive because there is no mention of domains or specific isoprenoid reaction products associated with the unspecified domains. Further, Applicant has not met the policy goals of the written description requirement as stated in the last paragraph of page 11 and the first paragraph of page 12 of the response for reasons of record, and for reasons stated supra.

Further more, Applicants' assertion that the specification and the amended claims describe "the production of at least one isoprenoid reaction product that is not produced in the absence of the second isoprenoid" is inconsistent because the specification teaches on page 14 lines 13-20 that the TEAS isoprenoid synthase produces two isoprenoid products 5-epi-aristolochene (80%) and a bicyclic sesquiterpene (20%), and thus there does appear to be a ratio of products and a ratio determining action independent of the chimeric constructs.

Applicant asserts on page 16 that U.S. Patent 5,824,774 shows novel enzymes capable of synthesizing new reaction products is incorrect. There is no mention of new reaction products in the claims or any reduction to practice of new reaction products taught in the specification.

Applicant asserts that the work of Schalk and Croteau PNAS 2000; pp. 11948-11953; demonstrates post filing evidence for chimeric enzymes generated by a domain swapping process (page 16 response). This is not made evident by Schalk *et al.* (PNAS, 97; (22): pp. 11948-11953), where the author's remarks are directed towards the involvement of specific residues and the importance of progressively placed directed mutations into a conserved region and not asymmetrically positioned domains as being determinant for changes in product formation. Further, the swapping of portions of the two respective enzymes analyzed by Schalk *et al.* did not follow recognized intron exon boundaries but rather were determined as a matter of conveniently located restriction sites within the cDNA. Moreover, the publication date of the cited reference is well after the date of the priority claim (4/12/1996) of the instant application and does not support Applicant's assertion that the reference provides a description of the broadly claimed genus of chimeric isoprenoid synthase polypeptides and polynucleotides encoding said polypeptides.

Applicant asserts on pages 19-20 of the response that the identification of specific domains responsible for specific products provides sufficient structural detail to conclude that the inventor had possession of the invention is not found persuasive because a newly defined group of monoterpene synthases, a sub group of the claimed isoprenoid synthases, isolated from snapdragon (Dudareva N. et al., The Plant Cell, May 2003, Vol. 15, p. 1227-1241; see page 1237 column 2 and page 1238 Figure 10). The isolated polynucleotides did not encode a conserved protein motif DDXXD that is associated with the biochemical mechanism of the monoterpene synthases identified previously from other plant species and were lacking a 200 amino acid region common to the subfamily. Hence there appears to be a different mechanism at work in the monoterpene synthases isolated from snapdragon as compared to other species; and thus not all isoprenoid synthases are similar enough to allow for general assumptions in their redesign or recombination into chimeric structures. Further with respect to Applicants' remarks on p. 20 of the response about the DDXXD motif, the claims are not limited to chimeric isoprenoid synthases comprising the DDXXD motif. Applicant assertions on page 21 of the response that a description of the products formed by the chimeric enzymes is not relevant to a written description of the invention is misplaced because the products formed by the enzymes would indicate the specific function of those enzymes. Claims 10-19 remain rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. This rejection is maintained for the reasons of record set forth in the

Official action mailed 12/13/2006 and 7/12/2007. Applicant's arguments filed 12/12/2007 have been considered but are not deemed persuasive.

Applicants' arguments with respect to enablement are largely directed to the argument that experimentation would be required and that what is largely known can be omitted from the specification and if predictability can be minimized by the knowledge in the art (response pages 23-27); see *Genentech, Inc. v. Novo Nordisk, A/S*, 42 USPQ2d 1001, 1005 (Fed. Cir. 1997), which teaches that disclosure of a "mere germ of an idea does not constitute [an] enabling disclosure", and that "the specification, not the knowledge of one skilled in the art" must supply the enabling aspects of the invention. Moreover, the structure of the broad genus of isoprenoid synthases and their respective functions are not largely known and would require undue experimentation.

Furthermore, Applicant has failed to respond to the enablement art cited teaching that unpredictability is evident in a newly defined group of monoterpene synthases, a sub group of the claimed isoprenoid synthases, isolated from snapdragon (Dudareva N. et al., *The Plant Cell*, May 2003, Vol. 15, p. 1227-1241; see page 1237 column 2 and page 1238 Figure 10). The isolated polynucleotides of Dudareva did not encode a conserved protein motif that is associated with the biochemical mechanism of the monoterpene synthases identified previously from other plant species and were lacking a 200 amino acid region common to the subfamily. Hence there appears to be a different mechanism at work in the monoterpene synthases isolated from snapdragon as compared to other species. Therefore, not all isoprenoid synthases are similar enough to allow for general assumptions in their redesign or recombination into chimeric structures.

In addition, since the publication dates of the cited references 2000 for Dudareva and Schalk and Croteau PNAS, are well after the date of the claimed priority (4/12/1996) of the instant application the references show that the state of the art did not and still does not support Applicant's broad claim to chimeric isoprenoid synthases; and contradict Applicant's assertions that the prior art and the relative skill of those in the art provide enablement for making and using the broadly claimed genus of chimeric isoprenoid synthase polypeptides or provide evidence that the degree of unpredictability is overcome by one of ordinary skill.

Applicant asserts that the Office has not met the burden of countering the actual examples in the specification. Those specific examples are not rejected. Rather the lack of examples is what forms the basis of the rejection and that there is no teaching in the art or applicant's specification to support the broadly claimed genus.

Given the unpredictability in the art as to which domains from which plants would tolerate chimerization; the breadth of the claims encompassing any plant cell comprising any number of enzymatic domains selected from a broad category of unspecified isoprenoid synthases; the lack of guidance in the specification or in the prior art as to which domains of the isoprenoid synthase enzyme family would best serve the invention; one would not know based upon Applicant's disclosure which embodiments would be inoperable and predictably eliminated. Thus, undue trial and error experimentation would be needed to make and clone a multitude of non-exemplified isoprenoid synthase chimeras and to test them in a myriad of non-exemplified expression systems for a multitude of non-exemplified isoprenoid products. Therefore, the invention is not enabled.

No claim is allowed.



Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russell Kallis whose telephone number is (571) 272-0798. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg can be reached on (571) 272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Russell Kallis/  
Primary Examiner, Art Unit 1638  
February 28, 2008

**Application Number****Application/Control No.**

10/717,500

**Applicant(s)/Patent under  
Reexamination**

CHAPPELL ET AL.

**Examiner**

RUSSELL KALLIS

**Art Unit**

1638